Operator’s manual

SCHMIDT® PressControl 3000

SCHMIDT® press system with force/stroke-monitoring and SCHMIDT® PressControl 3000

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Documentation structure

The operator's manual for the press system is divided into the following documentation modules:

Operator's Manual – SCHMIDT® Press

- Structure and function
- Assembly and startup
- Maintenance and servicing

Operator's Manual – SCHMIDT® SafetyModule

- Structure and function
- Mounting and startup
- Maintenance and servicing

Operator's Manual – SCHMIDT® PressControl 3000

- Structure and function
- Assembly and startup
- User interface
- Practical operation
- Maintenance and servicing

Technical documentation – SCHMIDT® press system

- Circuit diagram and pneumatic plan
- Manufacturer's Declaration or Declaration of Conformity
- Spare part lists
- Test certificates
- Description of special functions

Optional **User Manual – SCHMIDT® ControlTool - Teil 1**

- Installation
- User interface
- Project and dataset management
- Quality monitoring
- Update and service

Optional **User Manual – SCHMIDT® ControlTool - Teil 2**

- Fundamentals
- PLC programming
- Range of commands

Optional **User Manual – SCHMIDT® SPC**

- Structure and function
- User interface
- Practical operation

1 Safety

The press system has been built, manufactured and tested ex works for its function and safety in accordance with current safety regulations and state-of-the-art methods. This guarantees its operational safety. Nevertheless the press system can involve risks, if

- it is not used in accordance with its designated use,
- it is operated by untrained personnel,
- it is modified or converted incorrectly or
- the safety regulations are not observed.

The press system may only be used if it is in technically perfect condition. All required safety devices must be in place and fully functional.

Apart from the instructions listed in this operating manual, the current country-specific safety and accident prevention regulations provided by law apply.

1.1 Designated use

The control unit may be operated on a SCHMIDT PneumaticPress or a SCHMIDT HydroPneumatic Press only in connection with the SCHMIDT SafetyModule.

The control unit may only be used, together with the above mentioned components, for the following press processes:

- Assembling
- Riveting
- Crimping
- Bonding
- Forming
- Pressing
- Flaring
- Punching

Using the system for purposes other than those described above is contrary to the designated use. The manufacturer cannot be held liable for any damage resulting from such a use. The risk lies entirely with the user.

Do not make any changes to the press system which could impair safety. The manufacturer cannot be held liable for any damage resulting from such a use. The risk lies entirely with the user.

Designated use also includes:

- compliance with the documentation
- compliance with the inspection and maintenance measures

1.2 Organisational measures of the system operator

DANGER

Use as safety component

If the control has been delivered not ready for use (with a Declaration of Conformity according to Annex II b of the Machinery Directive 98/37/EC) the operator or the system manufacturer must ensure observance of the safety regulations.

☞ Of the safety regulations, observe in particular the Machinery Directive 98/37/EC and the standards DIN EN 349, DIN EN 292 and DIN EN 294.

The operator must make sure that

- the instructions contained in the operating manual concerning startup, operation and maintenance are observed.
- the press system is properly operated, tested and maintained and the responsibilities for these tasks are clearly set out.
- those persons responsible for activities on the press system have read this operating manual and, in particular, chapter “1 Safety”, before starting work. This also applies to persons who work only occasionally.
- this operating manual is always kept within easy reach at the workplace.

1.3 Risks

The press system is constructed so as not to put any persons at risk when used in accordance with its designated use. However, certain parts of the press system cannot be protected without limiting its functionality and usability. Thus, despite constructional safety measures, a residual danger remains.

Safe press operation requires the interaction of press, control unit, tools, safety devices and conduct of the user in accordance with the safety measures.

DANGER

Injuries or death caused by touching live parts

During assembly and repair work you may come into contact with parts which carry dangerous voltage in operation. Touching live parts may cause death.

☞ Any work on the electrical system or equipment must be carried out only by trained electricians or by specially instructed persons under the control and supervision of a trained electrician and in accordance with the applicable electrical engineering rules and regulations.

1.4 Safety devices

Figure 1-1: PressControl 3000

1 Operational status indicator 2 EMERGENCY STOP pushbutton

Operational status indicator

The operational status indicator is located on the display of the control unit.

The status indicator is lit in green permanently when the press system has been switched on and is ready for operation.

Emergency Stop pushbutton

There is an EMERGENCY STOP pushbutton on the control panel of the control unit.

What to do in an emergency

☞ Press the Emergency Stop pushbutton immediately in case of emergency.

The press system is taken to a safe operating state. All moving machines are stopped immediately and the press system is depressurised.

Start after Emergency Stop

☞ Eliminate the error.

☞ Unlock the Emergency Stop pushbutton by turning and pulling it.

☞ Switch the press system on again at the control unit.

2 PressControl 3000

2.1 Function

The SCHMIDT® Press System with force/stroke monitoring and SCHMIDT® PressControl 3000 operates according to the following principle:

Sequence control

The sequence control of the press process is done via a PLC program. The PLC program carries out the following functions:

- Control of the process data acquisition sequence
- Monitoring of the press process on the basis of the set quality parameters
- Plain text output on the display.

Additional functions (e.g. feeds, workpiece detection, sorting of OK and Not OK parts, etc.) are effected via the PLC program.

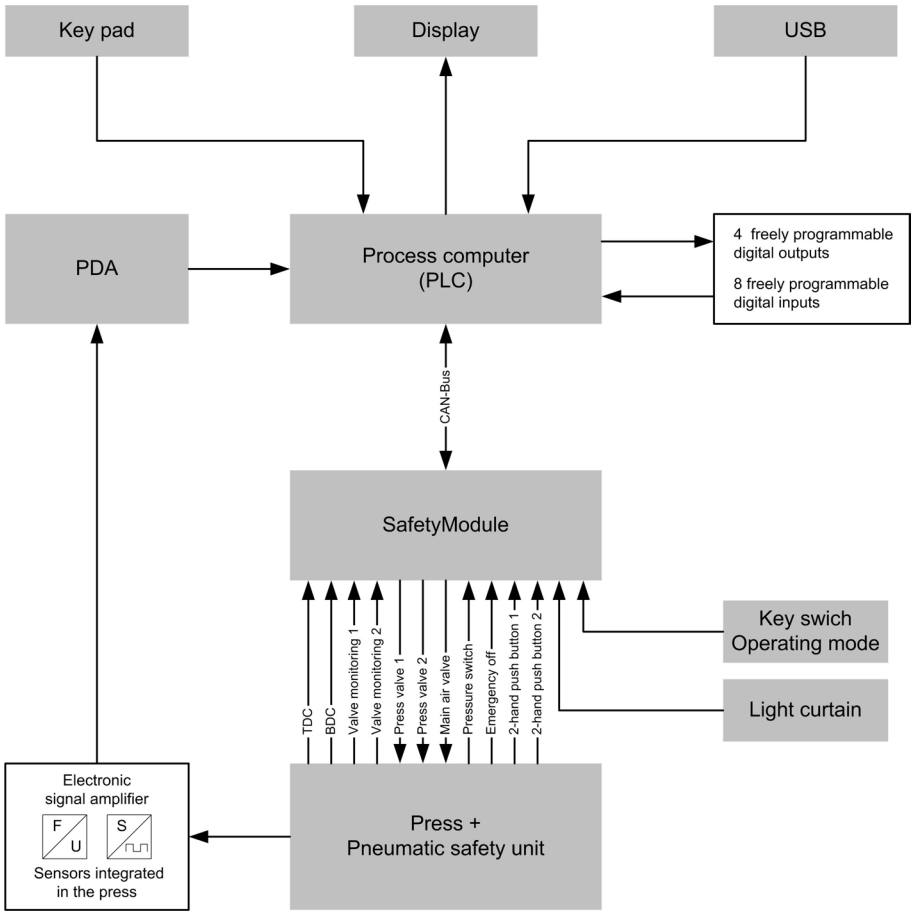

Figure 2-1: Block circuit diagram

2.2 Technical Data

Dimensions

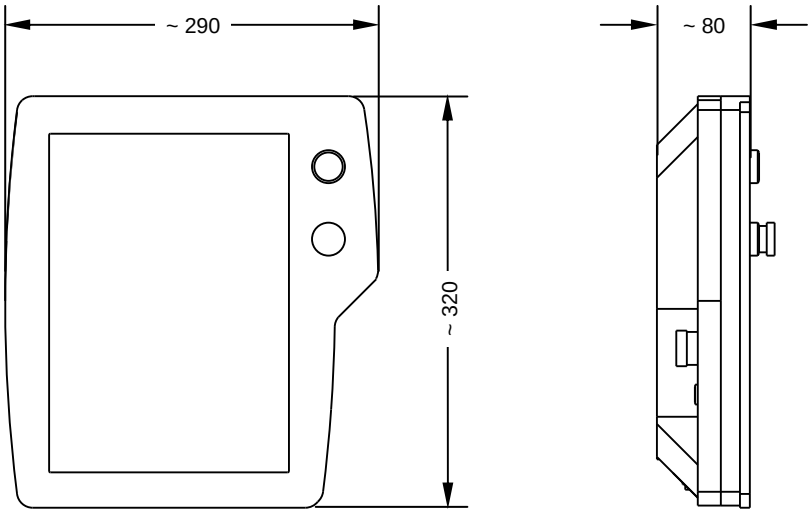

Figure 2-2: Dimensions of the control unit

Technical Data	
Display	Liquid crystal display (128 x 240 pixels) with background illumination, 16 lines of 40 columns each, with touch screen functions
Keypad	Touch screen
Interfaces	USB
Mains connection	100 up to V AC / 50 up to 60 Hz max. back-up fuse 16 A
Supply voltage	24 V DC
Current consumption	350 mA / 230 V or 700 mA / 110 V or 2.5 A / 24 V
Weight	5.5 kg incl. external power supply unit
Ambient temperature	0 up to 40° C
Air humidity	up to max. 95% relative, non condensing
Protection type	IP 54

3 Assembly and startup

CAUTION

Safety instructions

- ☞ The control unit may only be installed and serviced by setup engineers who have been commissioned and trained by the company.
- ☞ Any work on the electrical equipment of the press must be carried out only by trained electricians or by specially instructed persons under the control and supervision of a trained electrician and in accordance with the applicable electrical engineering rules and regulations.
- ☞ Check the control unit, accessories and all supply lines for possible damage prior to each startup.
- ☞ Switch off a defective press immediately or depressurise the pneumatic system immediately and have the malfunctions repaired as soon as possible.

3.1 Transport and storage

Delivery

- ☞ Check the delivered press system components for visible transport damage.
- ☞ Report any transport damage immediately to the following authorities:
  - the forwarding agent
  - the dispatch department of SCHMIDT Technology.
- ☞ Keep the original packaging for later transport and/or for further storage.

Transport

- ☞ Use the original packaging for further transport (service, repairs….).
- ☞ Ensure proper packaging of the components.

Storage

- ☞ Ensure proper packaging of the components, if they must remain unused for longer periods.
- ☞ Store the control unit in upright position (**do not** place on the display)
- ☞ Store the control unit in such a way that it is not subject to large fluctuations in temperature. Otherwise, the resulting condensed moisture may cause corrosion on critical press or control unit components.
- ☞ Please observe the information on the ambient conditions in chapter "2.2 Technical Data".

3.2 Connecting the control unit

The back of the control unit housing contains the following connections:

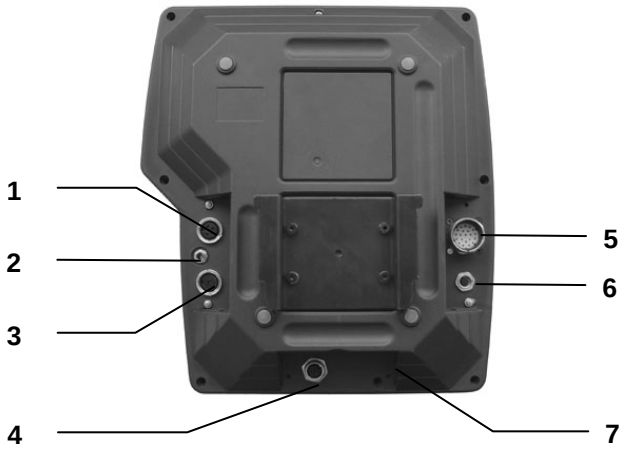

Figure 3-1: Connections

1	not used (only ManualPress)	5	Inputs/outputs
2	Supply voltage	6	Service
3	Force/stroke sensors	7	USB
4	CAN		

CAUTION

Damage to the force/stroke sensors

The cables may only be connected in the de-energized state. This applies especially to the connection of the force/stroke sensors.

☞ Connect the control unit in the order described below.

Communication

The communication between the control unit and the press or the force/stroke sensors takes place via two connections.

☞ Connect the control unit to the press using the cable for the force/stroke sensors (12-pin plug).

☞ Connect the control unit to the SafetyModule using the CAN-cable (5-pin plug).

Power supply

☞ Connect the control unit to the 24V power supply of the SafetyModule.

3.3 Installing the control unit

The control unit is equipped ex works with a control unit holder for table or wall mounting.

☞ Insert the control unit in the table holder.

☞ Tighten the fastening screw (1).

Figure 3-2: Control unit holder

1 Fastening screw (hidden in the figure)

2 Screw for inclination adjustment (on both sides)

The holder adapter in the control unit must not be removed.

Setting the inclination

The holder allows the control unit to be swivelled by 70°.

☞ Loosen the screw connections for the inclination adjustment (2).

☞ Set the desired control unit inclination.

☞ Tighten the screw connections for the inclination adjustment (2) again.

4 Operation

4.1 Operating elements

The SCHMIDT® PressControl 3000 press system is basically operated by means of the following operating elements:

Figure 4-1: Operating elements

1	LCD with touch screen	6	On/Off pushbutton
2	“Set contrast” key	7	EMERGENCY STOP pushbutton
3	Softkeys	8	System function keys
4	“Change operating level” key	9	Cursor keys
5	Numeric keys	10	"Acknowledge incorrect pressing" key.

4.2 User interface

System functions

Using the system function keys you can directly access the most important display modes having system functions.

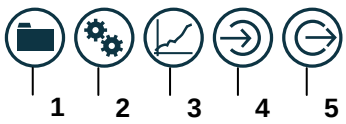

Figure 4-1: System function keys

1	Datasets	4	Data Input
2	System Options	5	Data Output
3	Curve Output		

Datasets In this display mode, you have access to the commands for dataset management. They include commands for creating, saving, renaming and loading datasets.

System Options

In this display mode, you have access to the commands for the system settings of the control. They include settings for time, date, alarms, machine parameters, interface definitions, etc.

Curve Output

In this display mode, you have access to the commands for displaying the recorded curve. They include commands for zooming, tolerance data input, and for displaying the curve.

Data Input

In this display mode, you have access to the machine parameters for operating the press system. They include parameters for the return stroke, for process data acquisition, or for quantities.

Data Output

In this display mode, the operator can view information on the state of the press system. This information includes data on the system condition, quantities, incorrect pressings, etc.

You can find detailed information concerning the most important menu commands in the following chapters.

Softkeys and operating levels

The SCHMIDT® PressControl 3000 press system is provided with a PLC program having a large number of basic functions. They can be activated by means of softkeys on the touch screen.

Softkeys

The following table describes the softkeys included in the standard PLC program.

Operating level	Softkey	Description
1	CtrON	Switch on control unit
	CtrOFF	Switch off control unit
	Servic	“Setup” operating mode (switch press to airless mode).
2	PCTon	Switch pre-selection counter on
	PCToff	Switch pre-selection counter off
	PCT-0-	Set pre-selection counter to zero
	CNT-0-	Set piece counter to zero
	ACK	Acknowledge fault
3	Ref.	Carry out a reference run

Changing operating level

The control starts automatically with operating level “1”.

☞ Press the "Change operating level" key (see Figure 4-1). This is how you switch to the next higher/lower operating level.

All softkeys labelled with asterisk have not been assigned. The assignment of the softkeys and their allocation to an operating level is done by the PLC program. For further information concerning the programming of additional softkeys, please see the "User Manual - SCHMIDT® ControlTool - Part 2".

4.3 Switching on and off

After all mounting and installation tasks are complete, the press system can be started.

As the control unit is supplied with voltage from the SafetyModule, it can also be switched on or off by means of the main switch of the SafetyModule.

☞ Start the press system as described in chapter “3.4 Switching on and off” in the "Operating Manual – SCHMIDT® SafetyModule".

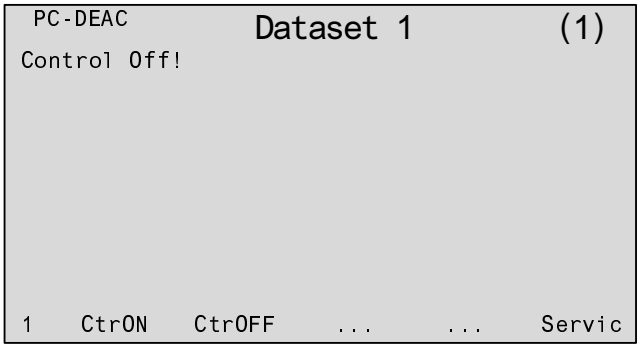

Figure 4-3: Display after the self-test

☞ Change to operating level 1.

☞ Select the “CtrON” softkey.

The system first carries out a self-test and then automatically starts the delivered PLC program. After the system has been switched on, the status indicator is lit and the message “Machine ok” appears on the display.

4.4 Reference run

After switching on the control unit, a reference run must be carried out. This is shown by the “Operate press <Ref>” message on the display.

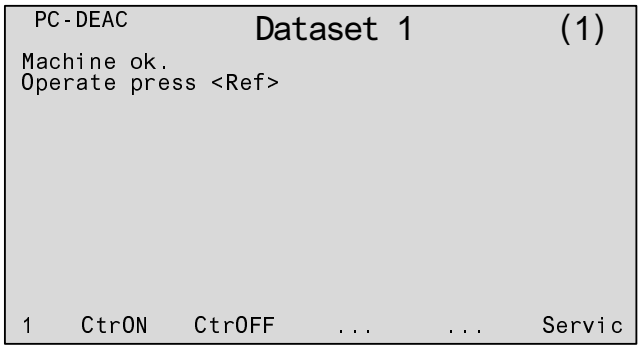

Figure 4-4: Display after switching on

☞ Carry out a working stroke. After reaching the reference point, the press moves automatically to the TDC position.

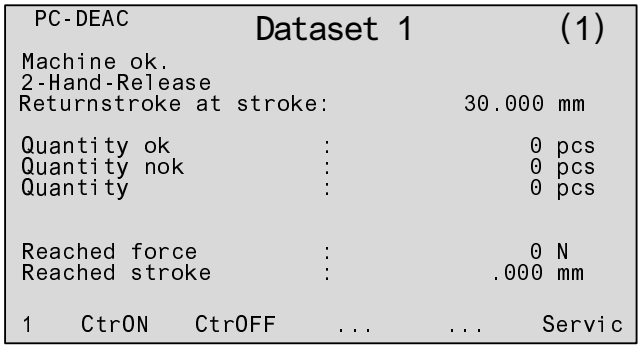

Figure 4-5: Display after the reference run

Manual reference run

In general you can always carry out a reference run manually. During this operation the control unit must **not** be switched off.

☞ Change to operating level 3.

☞ Select the “Ref” softkey.

☞ Perform the reference run, as described above.

5 Data Input

Various parameters (data input, system options, etc.) can be input directly at the control unit.

Calling data input

☞ Select the "Data Input" system function key.

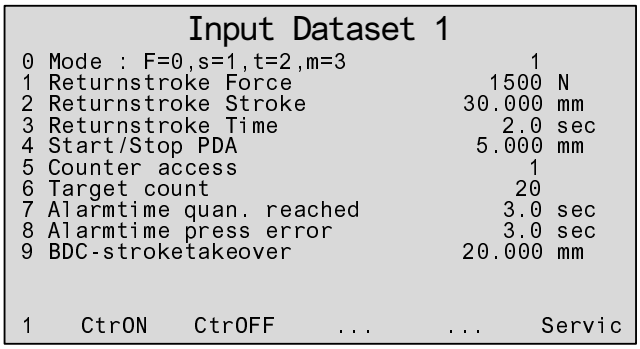
Input Dataset 1
0 Mode : F=0,s=1,t=2,m=3 1
1 Returnstroke Force 1500 N
2 Returnstroke Stroke 30.000 mm
3 Returnstroke Time 2.0 sec
4 Start/Stop PDA 5.000 mm
5 Counter access 1
6 Target count 20
7 Alarmtime quan. reached 3.0 sec
8 Alarmtime press error 3.0 sec
9 BDC-stroketakeover 20.000 mm
1 CtrON CtrOFF ... ... Servic

Figure 5-1: Data input

☞ Mark the desired parameter. The selected line is given a dark background.

☞ Press the "Enter" key. The previously set value is deleted and the cursor blinks at the input position.

☞ Enter the desired value using the numeric keys. Input errors can be corrected by means of the "Left" cursor key.

☞ Confirm the entry by pressing the “Enter” key.

Scrolling

10 input parameters can be displayed simultaneously on the display of the control unit. You can move from one parameter to the next by using the “Up” / “Down” cursor keys. With the "Left" and "Right" cursor keys, you can jump from on block of 10 to the next.

5.1 Default settings

Contrast

CAUTION

The display is blank

With increasing operating temperature, the contrast of the display diminishes. Since nothing can be seen any longer on the display, the user may think that the control is defective.

☞ Check if the contrast is set correctly using the "Contrast setting" key.

Figure 5-1: "Contrast setting" keys

1 "Contrast setting" keys

Machine parameters

CAUTION

Wrong evaluation of the quality parameters

The sensitivity of the sensors of the connected press is set by the machine parameters. The set parameters have been tested and should only be changed by experts.

☞ Select the "System Options" system function key.

☞ In the "System Options" submenu, select the "Machine Parameter" selection.

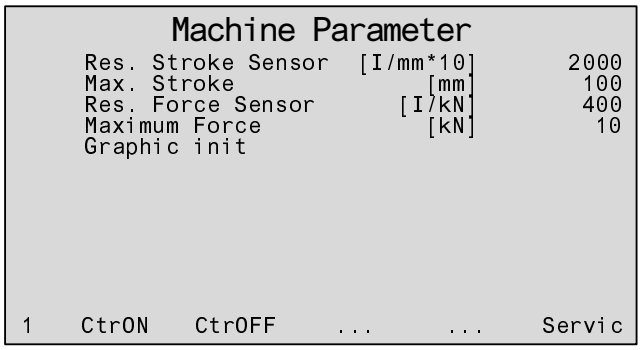
Machine Parameter
Res. Stroke Sensor [I/mm*10] 2000
Max. Stroke [mm] 100
Res. Force Sensor [I/kN] 400
Maximum Force [kN] 10
Graphic init
1 CtrON CtrOFF ... ... Servic

Figure 5-3: Machine parameters

☞ Modify the corresponding parameters according to the sensor type.

Parameter	5 kN	20 kN	100 kN	160 kN
Res. Stroke Sensor	2000	2000	2000	2000
Max. Stroke	100	100	100	100
Res. Force Sensor	400	100	20	16
Maximum Force	10	20	100	125

Please refer to chapter “5.1 Press data” in the operating manual of the press to find out which force sensor is integrated in which press.

☞ Confirm the entry of the parameters by pressing the “Graphic init” key.

UE470 address

The CAN gateway address must be correctly set for the communication between the control unit and the SCHMIDT® SafetyModule. The address “10“ is set by default in the CAN gateway and also in the control unit.

☞ Select the “System menu” system function key.

☞ Select the “Service” submenu in the “System Options” menu.

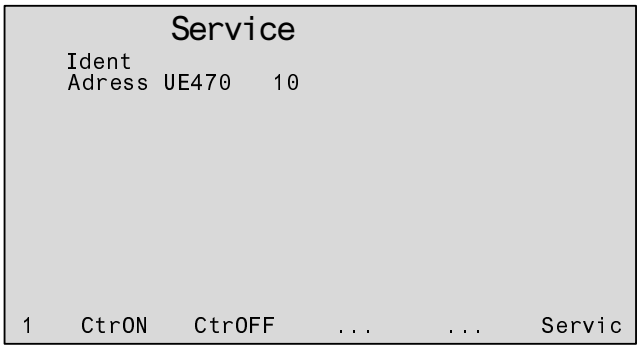

Figure 5-4: UE470 address

The address is set in the CAN gateway by means of two rotary switches.

Access

CAUTION

Assigning an access code and privilege level

The control is delivered ex works with complete access rights and with the access code "0".

☞ Limit access to the individual areas.

☞ Assign a new access code. This code consists of a number with a maximum of 9 digits.

These settings are made in the "System Options" display mode.

☞ Select the "System Options" system function key.

☞ Select the "Access Codes" menu.

☞ Enter the access code (default setting = "0").

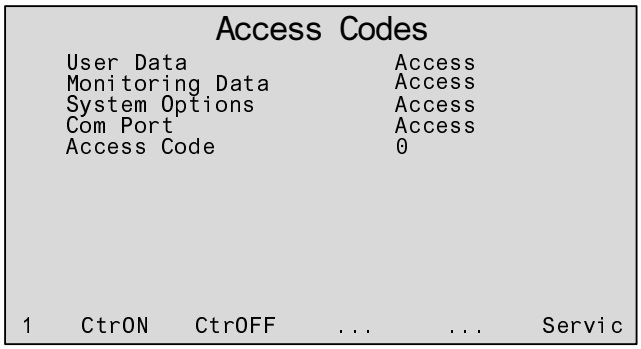

Figure 5-2: "Access Codes" submenu

Changing access code

- ☞ Select the "Access Code" command.
- ☞ Assign a new access code. This code consists of a number with a maximum of 9 digits.

Changing access authorization

- ☞ Select the access area which you would like to change.
- ☞ Confirm the selection with the "Enter" key. The setting is changed from "Access" to "No access" or visa versa.

Other features

Date + time

These settings are made in the "System Options" display mode.

- ☞ In the "System Options" submenu, select the "Date/Time" selection.
- ☞ Select the "Date" command and enter the date in the format "DD.MM.YY".
- ☞ Select the "Time" command and enter the date in the format "HH.MM.SS".

Alarms

You can define two alarm times (Time Alarm 1 and Time Alarm 2) that trigger an alarm daily. You further have the possibility to define an alarm time (Time Alarm 3) that is only triggered on a certain date (Date Alarm 3).

- ☞ In the "System Options" submenu, select the "Date/Time" selection.
- ☞ Select the desired alarm in the "Alarm" menu.
- ☞ Enter a time in format "HH.MM.SS" and the date in format "DD.MM.YY".

When the set alarm time is reached, a marker is activated in the PLC program. By querying this marker, you can initiate other actions. For further information, please see the "User manual - SCHMIDT® ControlTool - Part 2".

Volume

You can set the volume of the "key click" (acknowledgement when a key is pressed) and the volume of the alarm functions. You can enter values of "0" to "255" for both volumes.

Test the volumes under the usual background noise conditions to check if the alarm can be heard during normal production operations.

- ☞ In the "System Options" submenu, select the "Speaker Volumes" selection.
- ☞ Select the "Volume Keyclick" command and enter the desired value.
- ☞ Select the "Volume Alarm" command and enter the desired value.

5.2 Standard parameters overview

A total of 60 input parameters can be defined by means of the PLC program. The following table describes the parameters included in the standard PLC program.

CAUTION

Malfunctions of the press system

Parameters 9 to 11 / 51 to 59 are adapted ex works to the respective press system and should only be changed after consultation with SCHMIDT Technology.

No.	Parameter	Description
0	Mode: F=0,s=1,t=2,m=3	This parameter determines according to which criterion the return stroke is to be started (0=force, 1=stroke, 2=time, 3=manual).
1	Returnstroke Force	Force at which the return stroke is to be started.
2	Returnstroke Stroke	Stroke at which the return stroke is to be started.
3	Returnstroke Time	This parameter can be used to set a dwell time for the return stroke function of the press (0 to 600 sec). Only after this time has expired will the return stroke be started.
4	Start/Stop PDA	Stroke from which the process data acquisition begins / is stopped (return stroke)
5	Counter access	This parameter defines whether the piece counter can be reset or not (0=disabled, 1=enabled)
6	Target count	As soon as the set nominal piece number is reached, an alarm will be output.
7	Alarmtime quan. reached	Duration (0 to 10 sec.) for how long the alarm should sound when the number of pieces has been reached.
8	Alarmtime press error	Duration (0 to 30 sec.) for how long the alarm should sound in case of an incorrect pressing.
9	BDC-stroketakeover	From this stroke, the two-hand button can be released, as a result of which the stroke will be completely carried out. The stroke has to be set in such a way that the dangerous closing movement is finished when the stroke has been reached.
10	Servicetime	In the “Setting the time” mode the two-hand button has to be pressed for this time (0 to 20 sec.). After that the press is depressurised.
11	Alarm time STO	Duration (0 to 5 sec.) for how long the alarm should sound when the stroke signal in parameter 9 has been reached and the pressure switch is switched on.
13	Block-Limit-Window	This parameter defines whether the “Block limit window” function is active or not (0=active, 1=inactive)
14	min. force limit	If the “Block limit window” function is active, this parameter defines the minimum force which must be reached.
15	max. force limit	If the “Block limit window” function is active, this parameter defines the maximum force which may be reached.
16	min. stroke limit	If the “Block-limit window” function is active, this parameter defines the minimal stroke which must be reached.
17	max. stroke limit	If the “Block limit window” function is active, this parameter defines the maximum stroke which may be reached.

5 Data Input

No.	Parameter	Description
25	idle-stroke monitoring	This parameter defines whether the “idle-stroke monitoring” function is active or not (0=active, 1=inactive)
26	max.force idle-stroke	If the “idle-stroke monitoring” function is active, this parameter defines the maximum allowed force which must not be reached.
27	stroke for idle-stroke	If the “idle-stroke monitoring” function is active, this parameter defines the stroke which has be controlled.
30	PC on/off	This parameter defines whether the control unit has to be connected to an external PC for operation.
31	SPC on/off	This parameter determines whether the "SPC " has been switched on or not (0=off, 1=on).
40	Move tolerance on/off	This parameter defines whether the “Offset of tolerance data” function is active or not (0=active, 1=inactive)
41	Ref-pos. stroketol.1	This parameter defines the intersection of the reference curve with the stroke tolerance 1.
42	Force tare on/off	The "Force tare" function is used to tare the force value after each stroke to the value "0".
45	Part check on/off	This parameter defines whether a part is available on an optionally mounted workpiece fixture or not (0=active, 1=inactive)
47	ACK n.ok-box on/off	This parameter defines whether a part has fallen into an optionally mounted reject box or not (0=active, 1=inactive).
50	Bend up [mm/kN]	The measured bending constant eliminates the elastic properties of the overall system.
51	BDC signal (I1.3) exist.	This parameter defines whether the press is provided with a cylinder switch or not (0=not provided, 1=provided)
52	TDC signal (I1.4) exist.	dto
54	Sensor type	Enter the sensor type (5 kN, 20 kN, 100 kN or 160 kN) according to the activated press type.
55	Adm offsetdrift pos.	The allowed offset drift is set by default to 50 increments. If the value of the force measuring system exceeds the nominal value or drops below it by 50 increments when the control unit is switched on, the error message “Error force measuring system” appears on the display. This error message indicates a possible defect of the force measuring system (e. g. sensor deformed). The force measuring system should be immediately checked and calibrated again!
56	Adm offsetdrift neg.	dto.
57	Aq. distance PDA force	The “increment” of the process data acquisition determines the frequency of the written measuring points (standard value 5 inc., i.e., every 5 increments one measuring point). The larger the value, the fewer measuring points are written.
58	Aq. distance PDA stroke	dto.
59	Offset stroke	The “Offset stroke” value is machine specific. The measured value for the activated machine is included in the test certificate.

6 Text and system outputs

6.1 System outputs

Activating data output

☞ Select the “Data Output” system function key.

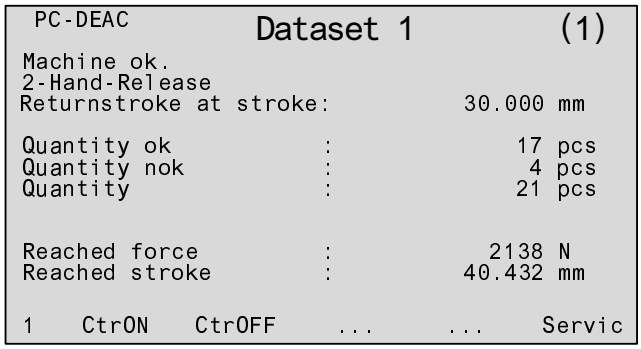

Figure 6-1: View “Output 1”

In this display mode, the operator can view information on the states of the press system. This information includes system messages, such as, for example, control on/off, piece numbers, incorrect pressings, etc.

6.2 Process data

Changing view

In another view, you can see the current process data of the sensors and the evaluation of the monitoring windows.

☞ By pressing the “Data Output” system function key, you can toggle between the two views.

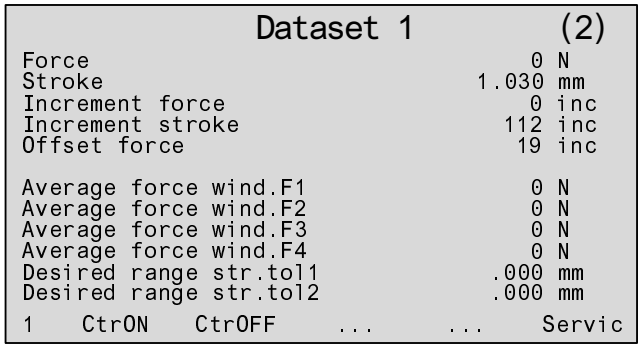
Dataset 1 (2)
Force 0 N
Stroke 1.030 mm
Increment force 0 inc
Increment stroke 112 inc
Offset force 19 inc
Average force wind.F1 0 N
Average force wind.F2 0 N
Average force wind.F3 0 N
Average force wind.F4 0 N
Desired range str.tol1 .000 mm
Desired range str.tol2 .000 mm
1 CtrON CtrOFF ... ... Servic

Figure 6-2: View “Output 2”

The average values of the force tolerances or the passages of the stroke tolerances are displayed only for the defined tolerances.

7 Press processes

7.1 Defining the press process

A press process is defined by the press parameters “force” and “stroke” and the selection of the return stroke criterion. These parameters are entered in the “Data Input” display mode and are automatically linked to the PLC program.

These settings are made in the "Data Input" display mode.

☞ Select the "Data Input" system function key.

Press parameters

The definition of a press process always requires “force” and “stroke” to be entered. Both parameters are monitored during the press process.

☞ Select the "Returnstroke Force" parameter.

☞ Enter the force that is not to be exceeded during the press process.

☞ Select the "Returnstroke Stroke" parameter.

☞ Enter the stroke that is not to be exceeded during the press process.

Return stroke criterion

The return stroke criterion determines the order in which “force” and “stroke” are monitored.

"force" return stroke criterion

When performing the press process with the “force” return stroke criterion, primarily the "Returnstroke Force" parameter and secondarily the "Returnstroke Stroke" parameter are monitored.

☞ Select the "Data Input" system function key.

☞ Select the "Mode: F=0, s=1, t=2, m=3" parameter.

☞ Enter the value "0".

If in a press process the set force is not reached, but the set stroke is exceeded, the error message: "P2:RS stroke exceeded!" is displayed.

"stroke" return stroke criterion

When performing the press process with the “stroke” return stroke criterion, primarily the "Returnstroke Stroke" parameter and secondarily the "Returnstroke Force" parameter are monitored.

- ☞ Select the "Data Input" system function key.
- ☞ Select the "Mode: F=0, s=1, t=2, m=3" parameter.
- ☞ Enter the value "1".

If in a press process the set stroke is not reached, but the set force is exceeded, the error message: "P1:RS force exceeded!" is displayed.

"time" return stroke criterion

When performing the press process with the return stroke criterion “time“, the press moves to the BDC position. When the time set in parameter "Returnstroke Time" has expired, the press moves to the TDC position.

- ☞ Select the “Data Input” system function key.
- ☞ Select the "Returnstroke Time" parameter.
- ☞ Enter the time after which the return stroke has to be started.
- ☞ Select the “Mode: F=0, s=1, t=2,m=3" parameter.
- ☞ Enter the value “2”.

If in a press process the BDC position is not reached, the error message "BDC not reached->ACK“ appears.

"manual" return stroke criterion

When the press process is performed with the return stroke criterion “manual“ the press moves to the BDC position. The press remains in the BDC position until it is acknowledged by means of the external luminous button. Then the press moves to the TDC position.

- ☞ Select the “Data Input” system function key.
- ☞ Select the “Mode: F=0, s=1, t=2,m=3" parameter.
- ☞ Enter the value “3”.

Stroke takeover (only two-hand control)

The stroke takeover is the moment of the working stroke from which the closing movement of the working stroke is no longer interrupted upon releasing the two-hand control.

This stroke takeover has to be set in such a way that the dangerous closing movement is finished upon reaching this switch.

A dangerous closing movement is that part of the movement of closing tools that may cause injures. It is finished, when moving parts and fixed parts have approached each other to such an extent that no more injury is possible (6 mm).

PneumaticPress

The stroke takeover is monitored in two channels by means of

- a pressure switch, which monitors the lower pressure chamber and
- a cylinder switch in the bottom dead centre (BDC)

The pressure switch has been set to a fixed value ex works and must not be adjusted.

☞ Set the cylinder switch for the stroke takeover. For further information, please refer to chapter “3.7 Setting the press stroke takeover” of the “Operator's manual – SCHMIDT PneumaticPress”.

☞ Check if the control unit settings for the existing cylinder switch(es) are correct.

☞ If necessary, adapt the “BDC signal (I1.3) exist.” parameter and the “TDC signal (I1.4) exist.".

HydroPneumaticPress

The stroke takeover is monitored in two channels by means of

- a pressure switch, which recognises the switchover from rapid approach stroke to power stroke and of
- the “BDC stroketakeover” parameter in the Press Control 3000 control unit.

The pressure switch has been set to a fixed value ex works and must not be adjusted.

☞ The “BDC stroketakeover” parameter has to be set in such a way that the dangerous closing movement is finished upon reaching this position.

7.2 Optimisation of the press process

Bend-Up (Yield Factor)

Every press system has a force-dependent deflection. This results from the elastic deflection of the machine, the tool, and the workpiece.

For stroke-dependent press operations without a positive stop (freely positioned), possible bend-up may lead to positioning errors due to dispersion of the press forces. Positioning accuracy in the range of 0.01 mm are practically impossible to attain without compensation of the deflection constants.

The drive control calculates the axis-specific and application-specific deflection constant in real-time. The representation of the deflection in the following figure is strongly exaggerated.

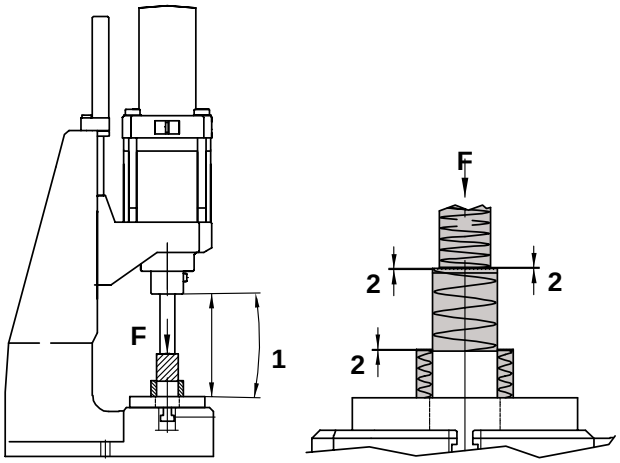

Figure 7-1: Positioning error due to deflection or compression

1 Deflection

2 Compression

Calculate deflection

After you have completely set up the press system (with tools), you can calculate the deflection. This can be done based upon a normal press sequence.

☞ Select the "Curve Output" system function key.

☞ Press a workpiece and record the force/stroke curve.

☞ Enlarge the curve section so that the press start and press end are visible.

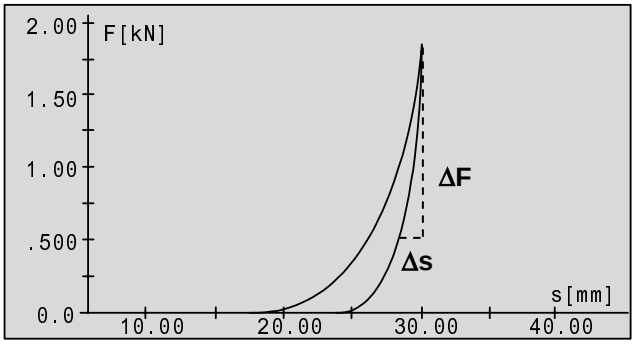

Figure 7-2: Calculate deflection

☞ Calculate the deflection.

Sample calculation:

Stroke difference Δs	=	2 mm
Force difference ΔF	=	1,7 kN
Deflection Δs/ΔF	=	1,176 mm/kN

Enter deflection

☞ Select the "Data Input" system function key.

☞ Select the "Bend up [mm/kN]" parameter.

☞ Enter the calculated value

Before - After

☞ Press another workpiece and record the force/stroke curve again.

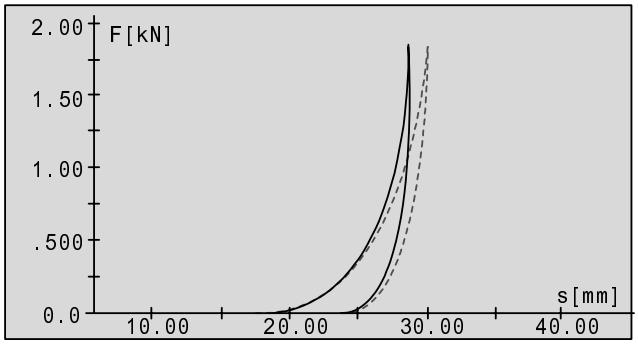

Figure 7-3: Force curve before and after deflection compensation

After deflection compensation is performed, the elastic properties of the entire system (machine, tool, workpiece) will be eliminated in each press operation in real time.

ATTENTION

Wrong parts evaluation

The maximum stroke (s_{max}) separates the working stroke from the return stroke. An overcompensation can result in a shift of s_{max} within the force curve.

If a return stroke tolerance in the diagram is above s_{max}, it is (by definition) part of the working stroke. Consequently, the measured value will not pass correctly through the tolerance window, so that "O.K." parts will be identified as "Not O.K. " parts.

- ☞ Avoid an overcompensation.
- ☞ Make sure to place the tolerance in a "safe" area, in which the measured value will pass correctly through the tolerance window in any case.

Overcompensation

By definition, the return stroke begins after reaching of s_{max}.

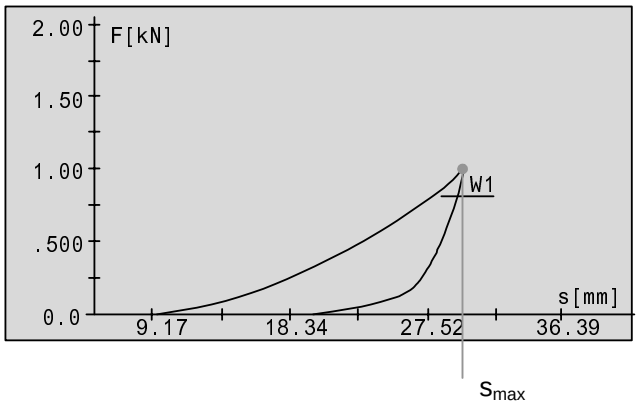

Figure 7-4: Stroke tolerance of the return stroke

Overcompensation (increased factor of deflection constants in mm/kN) may lead to a shifting of s_{max} within the force curve.

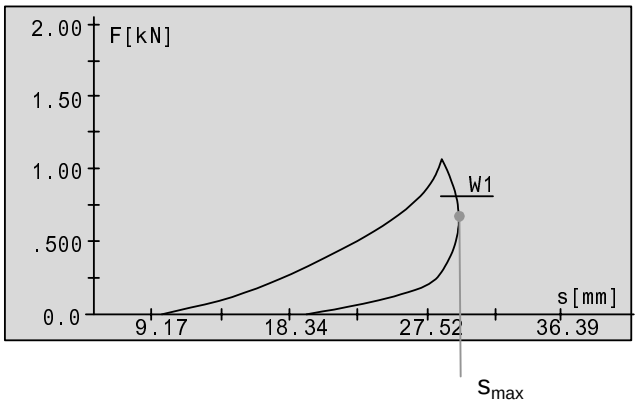

Figure 7-4: Stroke tolerance in working stroke with overcompensation

If the return stroke tolerance in the diagram is set above s_{max}, it is (by definition) in the working stroke. Consequently, “OK parts” will be interpreted as “Not OK parts” and assigned accordingly.

Since the working stroke will change to the return stroke very rarely at a fixed position, it may be difficult to find a suitable position for a tolerance in the return stroke.

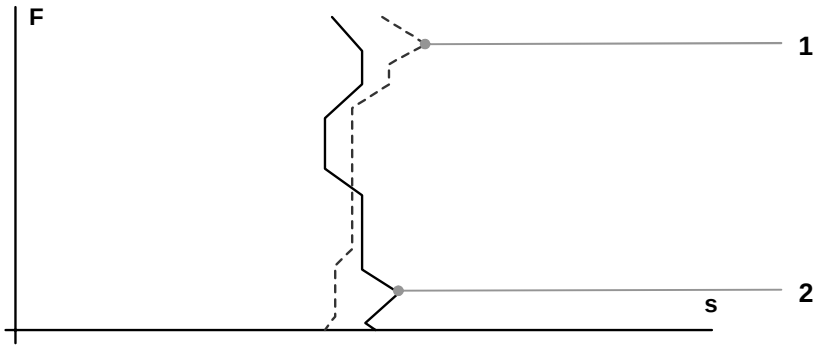

Figure 7-5: Different positions of s_{max}

1 Change from the working stroke to the return stroke (Pressing 1)

2 Change from the working stroke to the return stroke (Pressing 2)

Idle-stroke monitoring

This function allows you to monitor whether a max. allowed force (F_{max}) has not been reached or exceeded up to a certain stroke (s_x).

If in a press process the max. allowed force is reached, an error message will appear, and the press will move back to the TDC position.

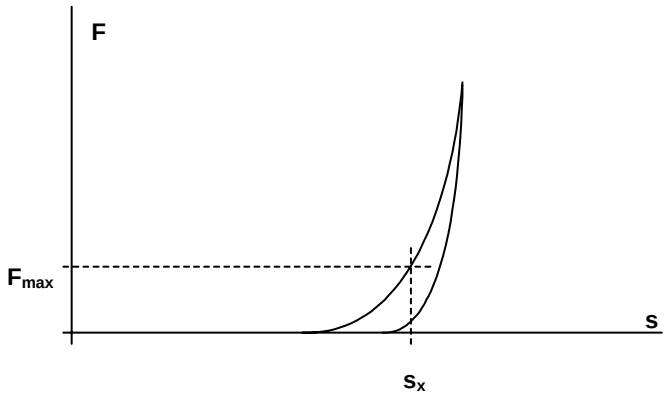

Figure 7-7 Idle-stroke monitoring principle

Defining the limits

☞ Define the limits of idle-stroke monitoring.

☞ Enter the corresponding values for the following parameters:

- max. force idle-stroke
- stroke for idle-stroke

Switching on

☞ Select the “idle-stroke monitoring” parameter.

☞ Enter the value “1”. Enter value “0” to deactivate the function.

Block limit window

This function allows you to monitor whether the reversal point of the force curve (change from the working stroke to the return stroke) is within certain limits.

If in a press process one of the determined limits has been reached, an error message will appear indicating which limit has not been observed.

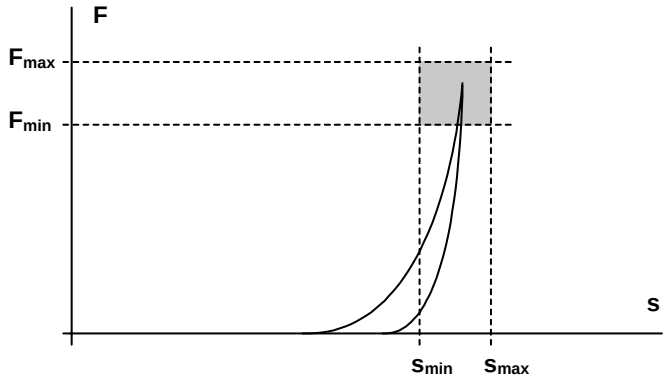

Figure 7-8: Block limit -window principle

In the control unit, no window is displayed. The limits are monitored by the parameters only.

Defining the limits

☞ Define the limits of the block limit window.

☞ To do so, enter the corresponding values for the following parameters:

- min. force limit
- max. force limit
- min. stroke limit
- max. stroke limit

Switching on

☞ Select the “Block-Limit-Window" parameter.

☞ Enter the value “1”. Enter value “0” to deactivate the function.

7.3 Acknowledging an incorrect pressing

An incorrect pressing can be acknowledged by pressing the "ACK" softkey.

☞ Change to operating level 2.

☞ Press the "ACK" softkey.

or

☞ Press the "Acknowledge incorrect pressing" key.

Acknowledging by means of external luminous button

In addition to the options of acknowledging an error described above, for severe production conditions, an external luminous button can be used to acknowledge an incorrect pressing.

☞ Connect the external luminous button for acknowledging incorrect pressing to the relevant input (see circuit diagram) of the SCHMIDT® SafetyModule.

Now the error messages can also be acknowledged using the external luminous button.

Acknowledging via luminous button only

If you want to acknowledge error messages exclusively by means of the external luminous button, you have to switch on additionally the “ACK n.ok-box on/off” parameter.

☞ Select the "Data Input" system function key.

☞ Select the " ACK n.ok-box on/off" parameter.

☞ Enter the value "1". To switch the function off again, enter the value "0".

Acknowledging by means of the reject box

Prerequisite

A function for the automatic acknowledgement of incorrect pressings is included in the scope of delivery of the PLC program. However, this function can only be used if a additional sensor is available. This sensor will detect whether the part of an incorrect pressing has fallen into a rejects box (Not OK box).

☞ Connect the sensor for the automatic acknowledgement of an incorrect pressing to the relevant input (see circuit diagram) of the SCHMIDT® SafetyModule.

Switching on the rejects box

☞ Select the "Data Input" system function key.

☞ Select the "ACK n.ok-box on/off" parameter.

☞ Enter the value "1". To switch the function off again, enter the value "0".

As soon as the function is switched on, the input is queried as to whether a part of an incorrect pressing has fallen into a connected rejects box (n.ok-box). This ensures that a "Not OK part" cannot continue the production process. The message "Press error! ACK" is acknowledged automatically as soon as the input transmits a signal.

If the function "Acknowledging by means of the reject box" is used, the incorrect pressing can **no** longer be acknowledged by pressing the "ACK" softkey or the "Acknowledge incorrect pressing" key.

7.4 Counter

Piece counter

By default, this counter is always switched on in the control as-delivered.

If, for monitoring the quality, tolerances have been set (see chapter "10.2 Tolerances"), the counter will distinguish between "OK parts" and "Not OK parts". In addition, the produced total number of pieces will be displayed.

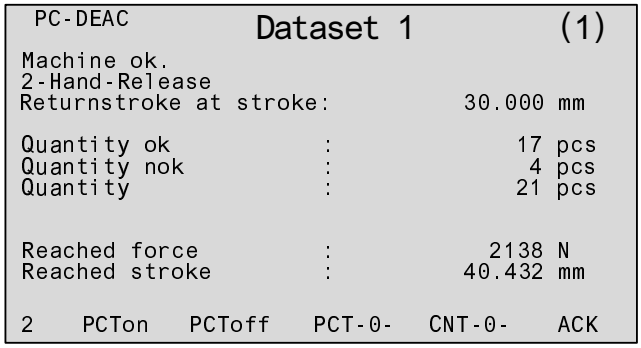

Figure 7-6: View of "Output 1" with default piece counter

Incorrect pressing

☞ Acknowledge the incorrect pressing. After that, you will be able to continue the work.

Reset

☞ If required, change to operating level 2.

☞ When you want to reset the piece counter, press the "CNT-0-" softkey.

Locking

You can lock this counter and prevent the piece counter from being reset.

☞ Select the "Data Input" system function key.

☞ Select the "Counter access" parameter.

☞ Enter the value "0".

Pre-selection counter

A pre-selection counter is integrated into the control unit in case the lot/batch sizes to be produced are always the same.

As soon as the set nominal piece number is reached, an alarm sounds. If, for monitoring the quality, tolerances have been set (see chapter "10.2 Tolerances"), the counter will distinguish between "OK parts" and "Not OK parts".

Setting

The nominal piece number and/or the duration of the alarm can be set in the data input, depending on the privilege level.

☞ Select the "Data Input" system function key.

☞ Select the "Target count" parameter.

☞ Enter the desired piece number.

☞ Select the "Alarmtime quan. reached" parameter.

☞ Enter the desired duration of alarm in seconds.

Switching on

After you have set the pre-selection counter, you can switch the pre-selection counter on.

☞ If required, change to operating level 1.

☞ Press the "PCTon" softkey.

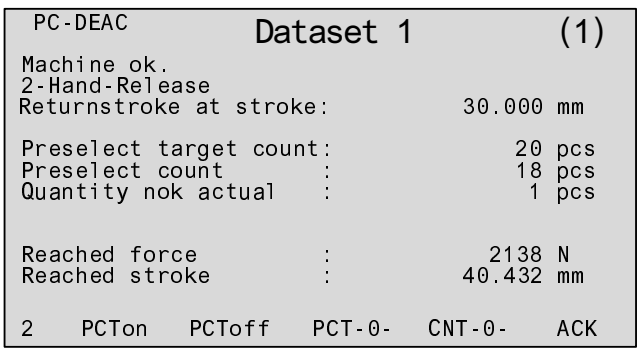

Figure 7-7: View of "Output 1" with activated pre-selection counter

Incorrect pressing

☞ Acknowledge the incorrect pressing. After that, you will be able to continue the work.

Resetting

As soon as the set number of pieces has been reached, an alarm sounds. If you want to continue to produce, you need to reset the pre-selection counter to zero.

☞ Press the "PCT-0-" softkey.

Switching off

☞ Press the "PCToff" softkey when you want to switch the pre-selection counter off.

Locking

You can lock this counter and prevent the pre-seletion counter from being reset.

☞ Select the "Data Input" system function key.

☞ Select the "Counter access" parameter.

☞ Enter the value "0".

8 Further integrated functions

8.1 Setup mode for tool change

For a simple setup of the press (e.g. change of heavy upper tools), the setup mode is available.

In the setup mode, the press moves to the BDC position. After the time set in the “Setup time” parameter has expired, the control unit is switched of and the press is depressurised.

Switching on the setup mode

- ☞ Select the “Data Input” system function key.
- ☞ Select the “Servicetime” parameter:
- ☞ Enter the time after which the control unit is to be switched off and the press to be depressurised.
- ☞ Change to operating level 1.
- ☞ Press the “Servic” softkey.

This operating mode is indicated by the word "*****SET UP*****" in output 1.

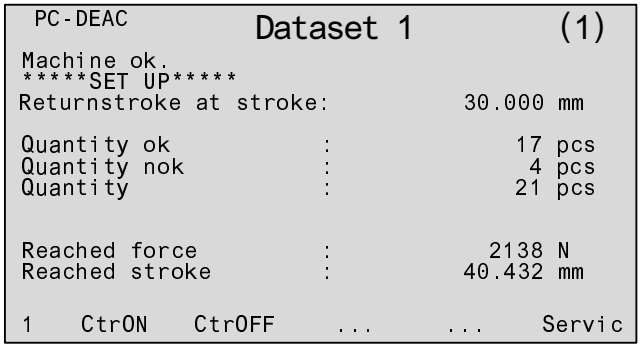

Figure 8-1: View “Output 1” displaying the word "***SET UP*****"**

Leaving the setup mode

- ☞ Change to operating level 1.
- ☞ Press the “CtrOn” softkey.

8.2 Operation with ControlTool

As-delivered, the control has been configured for operation without connection to an external PC. The note "PC-DEAC" in the left upper corner of the control display tells you that this operating mode is active.

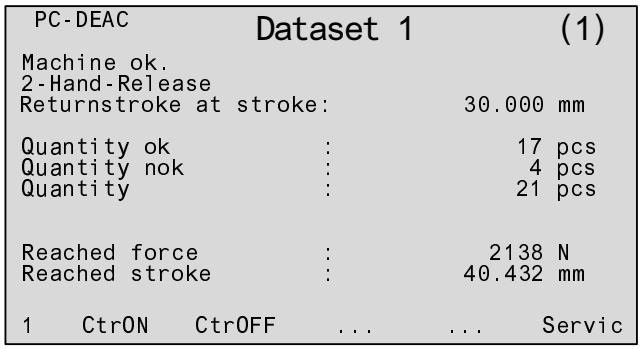

Figure 8-2: View of "Output 1" including the note "PC-DEAC"

SCHMIDT® ControlTool

When operating the control on an external PC using SCHMIDT® ControlTool software, a press stroke is only possible if the PressControl 3000 is connected to ControlTool. If there is no connection, the stroke will be blocked.

Configuring the press

- ☞ Select the "Data Input" system function key.
- ☞ Select the "PC on/off" parameter.
- ☞ Enter the value "1". To switch the function off again, enter the value "0".

As long as no connection has been established to the PC, the stroke remains blocked. In addition, the control displays "! PC not ready !".

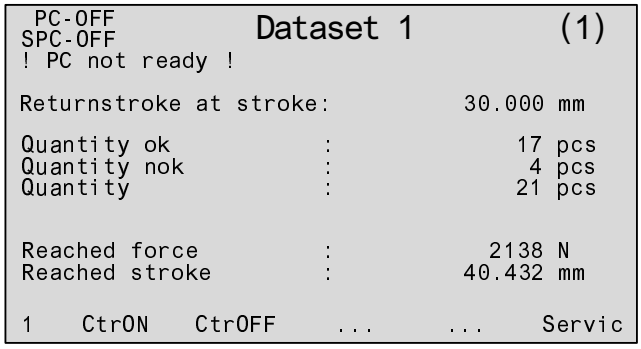

Figure 8-3: View of "Output 1" including the note "! PC not ready !"

Establishing a connection

- ☞ Configure the press system in the SCHMIDT® ControlTool software (see section "Define press unit" in the "User Manual - SCHMIDT ControlTool - Part 1").
- ☞ Establish the connection (see chapter "4.1 Establishing a connection to the control" in the " User Manual - SCHMIDT® ControlTool - Part 1").

Switching on the SPC

- ☞ Select the “Data Input” system function key.
- ☞ Select the "SPC on/off" parameter.

☞ Enter the value "1". To switch the function off again, enter the value "0".

As long as the function „SPC“ in ControlTool is not activated, the stroke will be blocked. In addition, the control display will tell you "SPC not ready".

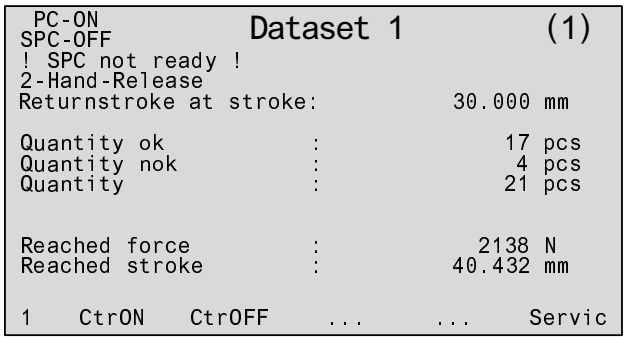

Figure 8-4: View of "Output 1" including the note "SPC not ready"

8.3 Taring the force value

By default, the force value displayed in Data output 2 is tarred during the reference run, i.e., when the system is switched on. With the machine running, it may happen that the force value changes. In this case, at no load of the ram, the force value "0" is no longer displayed.

Switching on

The "Tare force value" function is used to tare the force value before each stroke.

☞ Select the "Data Input" system function key.

☞ Select the "Force tare on/off" parameter.

☞ Enter the value "1". To switch the function off again, enter the value "0".

CAUTION

Production of defective parts

If this function is permanently switched on, a possible defect on the force sensor may not be detected in time. This may result in defective parts being produced that are not detected as "defective".

☞ Switch off the function, as soon as the function is no longer needed.

8.4 Parts inquiry

Prerequisite

A function for parts inquiry is included in the scope of delivery of the PLC program. However, this function can only be used if a additional sensor for parts inquiry is available.

☞ Connect the sensor for parts inquiry to the relevant input (see circuit diagram) of the SCHMIDT® SafetyModule.

8 Further integrated functions

Switching on the parts inquiry

- ☞ Select the "Data Input" system function key.
- ☞ Select the "Part check on/off" parameter.
- ☞ Enter the value "1". To switch the function off again, enter the value "0".

As soon as the function is switched on, the input is queried as to whether a part is available on an optionally mounted workpiece fixture.

If no part is in the fixture, the message ">Part insert>“ appears. The hand lever will remain locked until the input transmits a signal. After inserting a part, the message will disappear.

After the press process, the message "<Part remove<“ will appear. The message will disappear as soon as the part is removed. A possible incorrect pressing can only be acknowledged after the workpiece has been removed.

9 Dataset management

What is a dataset ?

A dataset is used for the parameterization of the press system, to adapt it, for example, to the production of different parts. A dataset includes all

- Working parameters (user data input)
- Monitoring parameters (8 tolerance windows, 4 stroke tolerances)
- Setting of the process data acquisition (zoom window, type of representation, etc.).

9.1 Principle of the dataset management

CAUTION

Loss of the dataset due to replacement or defect of the control

The parameters and settings mentioned above can be stored for 20 datasets in 20 memory locations of an EPROM in the control.

In the case of control replacement (i.e., changing location) or a defect in the control, the datasets can get lost.

☞ Make note of the most important settings after having set up the working process.

☞ Use the optional SCHMIDT® ControlTool software for dataset management on a computer.

Principle

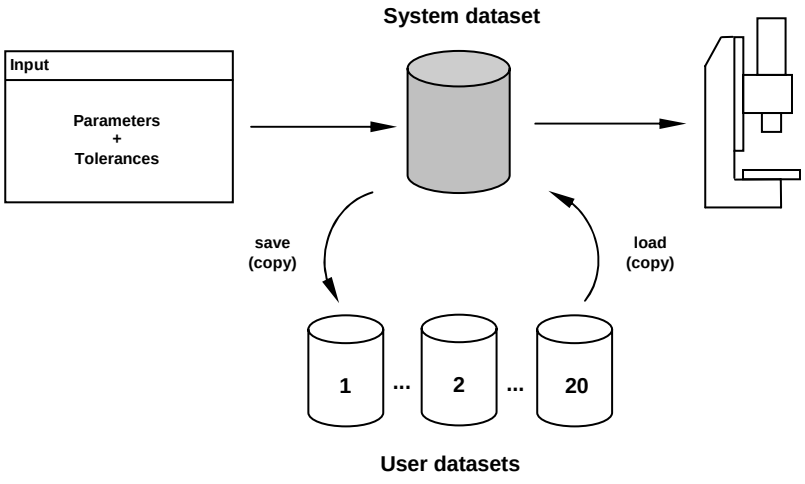

Figure 9-1: Principle of dataset management in the control

The data contained in the system dataset is used to operate the press system. To achieve this, a user dataset is loaded to the system dataset. It can now be edited for the press system operation via the “Data Input”.

Parameter changes in the system dataset have an immediate effect only upon the next press process but not upon the original dataset. If you wish to retain the changes, you need to save the changed system dataset as a user dataset. For this, a total of 20 storage locations for user datasets is available.

9.2 Managing multiple datasets

Creating and storing datasets

In the control unit, 20 datasets can be stored in the respective memory locations.

- ☞ Define the press parameter as described in chapter "7.1 Defining the press process".
- ☞ Define the tolerance data as described in chapter "10.2 Tolerances".
- ☞ Select the "Datasets" system function key.
- ☞ Select the "Save File" command.
- ☞ Using the "Up" / "Down" cursor keys, select one of the 20 memory locations and confirm with "Enter".

Figure 9-2: Save dataset

Load dataset

Datasets created and saved earlier can be loaded when needed.

- ☞ Select the "Datasets" system function key.
- ☞ Select the "Load File" command.
- ☞ Using the "Up" / "Down" cursor keys, select one of the 20 memory locations and confirm by pressing "Enter".

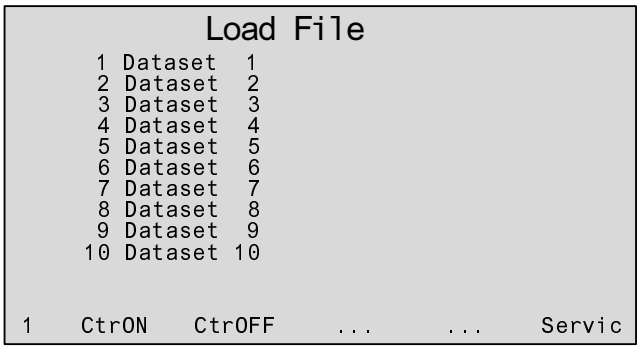

Figure 9-3: Load dataset

In this dialog the memory locations of the datasets are listed. At the first startup of the control unit, all datasets receive identical values, and are numbered sequentially from 1 to 20.

Renaming dataset

The name of the dataset is displayed in the system functions "Data Input", "Data Output" and in the "Curve Output" in the right, upper corner of the display.

The currently loaded dataset can be renamed. A total of 21 characters can be used for a dataset name.

☞ Select the "Datasets" system function key.

☞ Select the "Filename" command. The cursor blinks below the first letter of the dataset name to be edited.

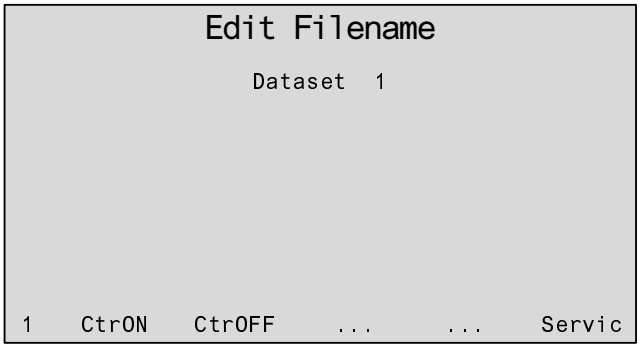

Figure 9-4: Renaming dataset

☞ Select the desired letter using the "Up" / "Down" cursor keys. The letters "a" to "z", "A" to "Z" and a few special characters are available.

☞ Move to the next letter with the "Right" cursor key.

Now you may select the further letters, as already described. Using the "Left" cursor key, you can again select the front letters.

☞ Exit the "Edit Filename" dialog with the "Enter" key.

☞ Afterwards, save the dataset at one of the 20 memory locations.

10 Quality monitoring

10.1 Curves

The press system records the individual force and stroke data during the pressing process. This data is then represented as a force curve in a force/stroke diagram.

Activating curve output

☞ Select the "Curve Output" system function key.

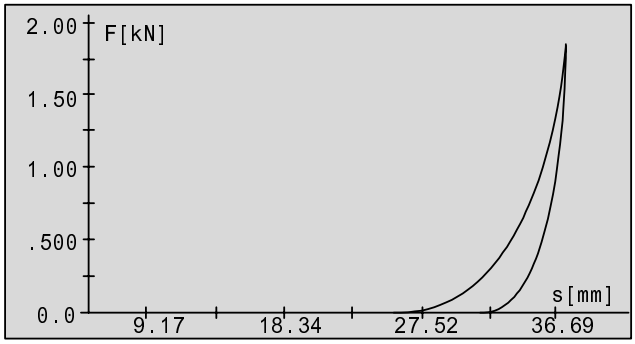

Figure 10-1: Curve Output

Curve display

You can modify the display of the curves in the "Curve Output" display mode. These settings are made in the "Diagram selection" menu.

☞ Select the "Curve Output" system function key.

☞ Press the "Enter" key.

☞ Select the "Diagram Mode" command.

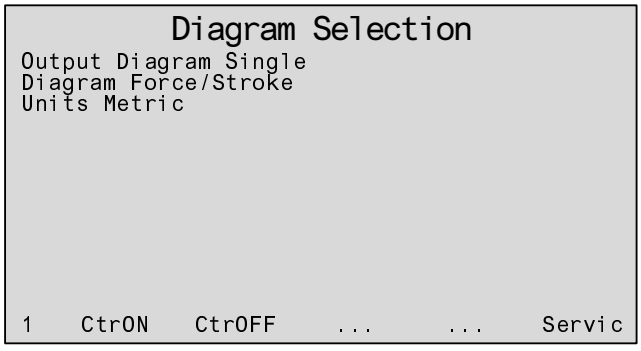

Figure 10-2: "Diagram Selection" menu

Curve output

By default, when the curve output is called, only the last recorded curve is displayed (parameter "Output Diagram" = "Single"). Alternatively, you can also establish that the curves of the production process be displayed as a group.

☞ Select the "Output Diagram" parameter.

☞ Press the "Enter" key. The parameter is set with the value "Continuous".

By pressing the "Enter" key again, you can reset the parameter to "Single".

Diagram type

By default, when the curve output is called, the force/stroke diagram of the pressing process is displayed.

Alternatively, you can have the press curves displayed in a force/time or stroke/time diagram. This allows individual process sequences to be visualized, which can then be used for optimizing further pressing processes.

☞ Select the "Diagram" parameter.

☞ Select the desired diagram type by pressing the "Enter" key several times.

System of units

By default, the diagram is displayed in the metric system of units (mm/kN).

☞ Select the "Units" parameter.

☞ Press the "Enter" key. The parameter is assigned the value "Imperial/US". Now the diagram will be displayed in the units "lbs" and "inch".

By pressing the "Enter" key again, you can reset the parameter to "Metric".

Enlarging details

To make detailed examinations, you have the possibility to enlarge individual details of the curve (zoom functions). These settings are made in the "Zoom diagram" menu.

☞ Select the "Curve Output" system function key.

☞ Press the "Enter" key.

☞ Select the "Zoom Functions" command.

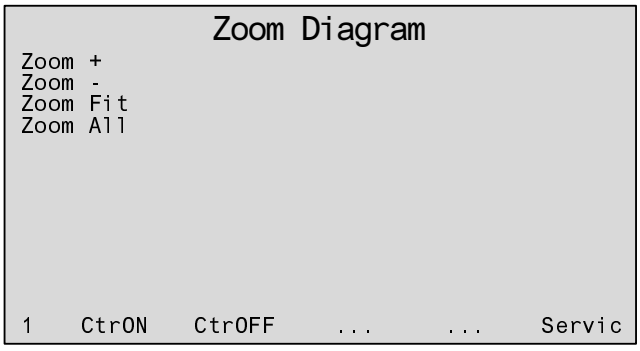

Figure 10-3: "Zoom Diagram" menu

Zoom All The recorded curves, together with their respective tolerance limits, are displayed in the curve output over the entire force and stroke range.

Zoom Fit The recorded curves, together with their respective tolerance limits, are displayed in the curve output in the adapted form.

Zoom + To enlarge a certain area:

- ☞ Select the "Zoom +" command. The display switches to curve output and a cursor appears additionally.
- ☞ Move the cursor using the cursor keys to the left, upper corner of the desired detail and confirm the position with the "Enter" key.
- ☞ Move the cursor using the cursor keys to the right, lower corner of the desired detail and confirm the position with the "Enter" key. The selected detail shown enlarged.

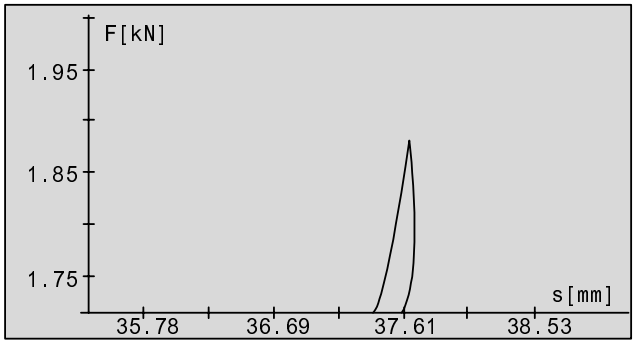

Figure 10-4: Enlarged section

Zoom - This ends the enlarged display. The display goes back to the last curve display.

10.2 Tolerances

Reference data

With the help of the reference data, the quality features can be defined for individual workpieces.

Record reference data To be able to define the quality requirements for the individual workpieces, you first have to record the reference data.

- ☞ Set the "Output Diagram" parameter to "Continuous" to display all force curves as a group of curves.
- ☞ Produce a workpiece and check whether it meets the quality requirements.
- ☞ Repeat the production process and the check until a Not O.K. part is produced. When compared to the recorded curves, this Not O.K. part exhibits an outlier in at least one place.

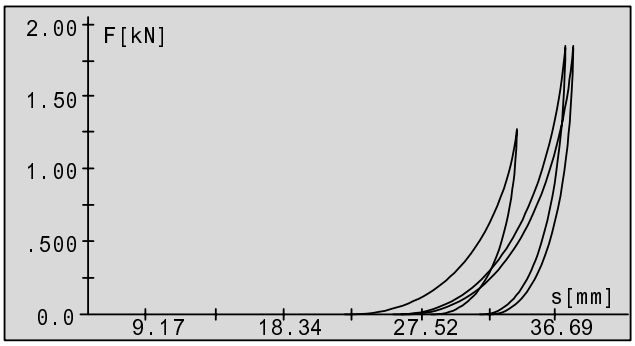

Figure 10-5: Reference data with " outliers "

Defining quality range

After having collected the reference data, you can establish the valid quality range.

- ☞ Find out which pressing curves come from "O.K. parts".
- ☞ Define the quality features of the "O.K. part" curves.
- ☞ Define the force/stroke tolerances as required.

Force tolerances

The force tolerances are displayed as monitoring windows. These windows limit the allowed minimal and maximum pressing force values within the defined pressing stroke.

The control system continually checks if the pressing process is running within this monitoring window. The force curve must enter from the left vertical line of the window and leave the window by the right vertical line. If during the working process force values occur that exceed/fall under the defined tolerance limits, the control unit will output a suitable optical and acoustic error signal.

A maximum of 8 monitoring windows can be defined which may overlap as desired.

Creating force/stroke window

- ☞ Select the "Curve Output" system function key.
- ☞ Press the "Enter" key.
- ☞ Select the "Input Monitoring Data" command.
- ☞ Select the "Create Window" command. The display switches to the curve output and a cursor appears additionally.
- ☞ Move the cursor using the cursor keys to the left, upper corner of the desired window and confirm the position by pressing the "Enter" key.
- ☞ Move the cursor using the cursor keys to the right, lower corner of the desired window and confirm the position by pressing the "Enter" key.

  In the curve output, the tolerance window created is displayed with the designation "F". The tolerances are numbered sequentially.

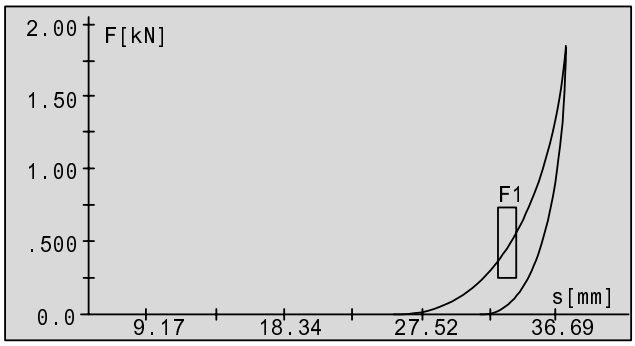

Figure 10-6: Defined force tolerance

Deleting force/stroke window

- ☞ Select the "Curve Output" system function key.
- ☞ Press the "Enter" key.
- ☞ Select the "Input Monitoring Data" command.
- ☞ Select the "Delete Window" command. The display switches to the curve output and a cursor appears additionally.
- ☞ Move the cursor using the cursor keys to the left, upper corner of the tolerance to be deleted, and confirm the position by pressing the "Enter" key.

  That tolerance window will always be deleted whose left, upper corner lies closest to the cursor.

Stroke tolerances

The stroke tolerance defines a section in which an expected change in force occurs (the slope of the curve changes upon contact between two workpieces, e.g., socket --> pin).

If a value falls below the minimum or exceeds the maximum value of this stroke tolerance, a suitable error message is sent to the control unit.

Selecting stroke tolerance

When defining the stroke tolerances, a distinction is made between a tolerance in the working stroke and a tolerance in the return stroke A maximum of four stroke tolerances can be defined.

- ☞ Select the "Curve Output" system function key.
- ☞ Press the "Enter" key.
- ☞ Select the "Stroke Tolerance in xxx" command. By pressing repeatedly the "Enter" key, you can select the desired stroke tolerance.

Creating stroke tolerance

- ☞ Select the "Create Stroke Tolerance" command when you want to create a stroke tolerance in the working stroke.
- ☞ Move the cursor using the cursor keys to the left corner of the desired stroke tolerance and confirm the position by pressing the "Enter" key.
- ☞ Move the cursor using the cursor keys to the right corner of the desired stroke tolerance and confirm the position by pressing the "Enter" key.

The stroke tolerance created is displayed in the curve output with the designation "WA"/"WR". The tolerances are numbered sequentially.

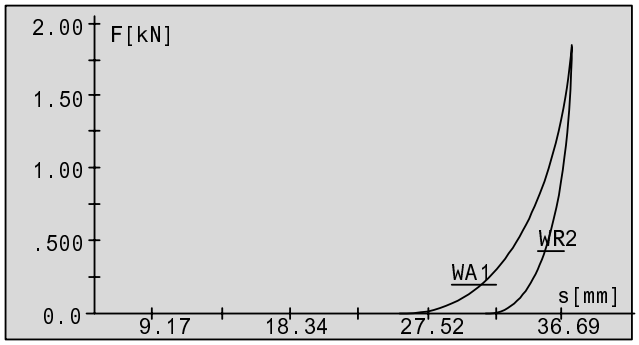

Figure 10-7: Defined stroke tolerances

Deleting stroke tolerance

- ☞ Select the "Curve Output" system function key.
- ☞ Press the "Enter" key.
- ☞ Select the "Input Monitoring Data" command.
- ☞ Select the "Delete Stroke Tolerance" command. The display switches to the curve output and a cursor appears additionally.
- ☞ Move the cursor using the cursor keys to the left corner of the tolerance to be deleted, and confirm the position by pressing the "Enter" key.

  The stroke tolerance that will be deleted is always the one whose left corner is closest to the cursor.

Managing tolerances

After you have defined the tolerances using the cursor keys, you can display the values of every single tolerance numerically and change them, if necessary.

- ☞ Select the "Curve Output" system function key.
- ☞ Press the "Enter" key.
- ☞ Select the "Monitoring Data Numeric" command.

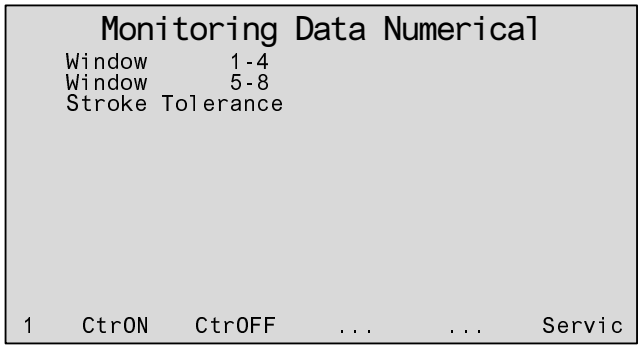

Figure 10-8: "Monitoring Data Numerical" menu

☞ Select the desired tolerance.

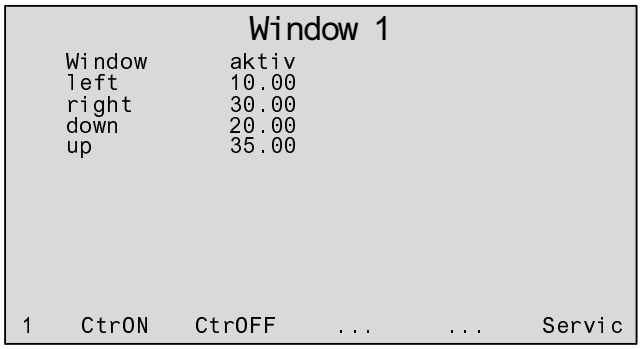

Figure 10-9: Changing the tolerance numerically

☞ Enter the corrected values for the individual parameters.

In the case of force tolerances, you have the possibility to set individual windows to "not active".

In the case of stroke tolerances, you have the possibility to transfer the tolerance from the "Working Stroke" to the "Return Stroke" (or vice versa), or to set the tolerance to "not active".

By using the "Not active" setting, you can hide tolerances (they will not be taken into account by the quality evaluation) without deleting the tolerances.

Move tolerance data

The curve of the reference force curve shows a characteristic press process. The length tolerances of the parts can offset the curve on the X axis in the positive or negative direction.

To be able to monitor press processes of this type efficiently, the tolerances must be offset as a function of the length of the components. This is done by the "Move tolerance data" function.

Define offset

The offset is determined via the intersection of the reference curve with a stroke tolerance.

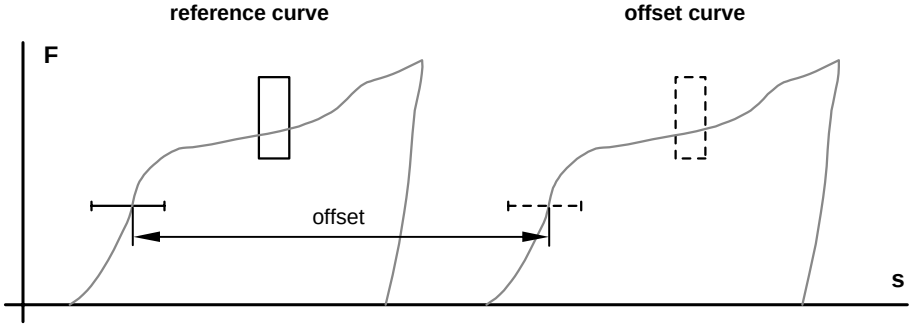

Figure 10-10: Principle of the offset of the tolerance data

☞ Select the "Data Input" system function key.

☞ Select the "Move tolerance on/off" parameter.

☞ Enter the value "0"

☞ Record the data of a reference curve.

☞ Determine the target passage in a stroke tolerance. This value can be read in the “Desired range str.tol1” line of the Data Output 2.

☞ Select the "Data Input" system function key.

☞ Select the "Desired range str.tol1" parameter.

☞ Enter the value for the target passage.

Switching on/off the offset

☞ Select the "Data Input" system function key.

☞ Select the "Move tolerance on/off" parameter.

☞ Enter the value "1". To switch the function off again, enter the value "0".

With the function switched on, the tolerance windows will be offset in each press process automatically by the difference of the actual and target passages in the reference curve of stroke tolerance 1. This offset is displayed in the curve window.

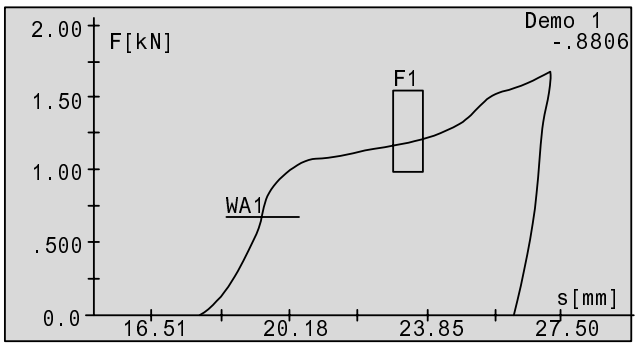

Figure 10-11: Force curve with offset of the tolerance data

11 Maintenance and servicing

CAUTION

Safety instructions

- ☞ The control unit may only be installed and serviced by setup engineers who have been commissioned and trained by the company.
- ☞ Any work on the electrical equipment of the press must be carried out only by trained electricians or by specially instructed persons under the control and supervision of a trained electrician and in accordance with the applicable electrical engineering rules and regulations.
- ☞ All spare parts must comply with the technical requirements established by SCHMIDT Technology. This is always guaranteed in the case of original spare parts.

11.1 Setting the force offset

Each force sensor has a different output signal in the unloaded state. However, this output signal must be in a defined range. The force offset allows you to adjust the output signal.

Switch on control

- ☞ Switch the control unit on.
- ☞ Select the "Data Output" system function key.
- ☞ Press the "Data Output" system function key again. Now the current process data of the sensors and the evaluation of the monitoring windows will be displayed.

  The “Offset force” parameter will show the currently set force offset.

```
                Dataset 1          (2)
Force                                0 N
Stroke                           1.030 mm
Increment force                      0 inc
Increment stroke                   112 inc
Offset force                        19 inc

Average force wind.F1                0 N
Average force wind.F2                0 N
Average force wind.F3                0 N
Average force wind.F4                0 N
Desired range str.tol1            .000 mm
Desired range str.tol2            .000 mm
1   CtrON   CtrOFF    ...     ...    Servic
```

Figure 11-1: View of “Output 2”

Setting the force offset

The force offset can be set at the amplifier board via a potentiometer.

- ☞ Set the force offset to a value of about “50”. To increase the force offset, turn the screw on the potentiometer to the left. To decrease the force offset, turn the screw on the potentiometer to the right.

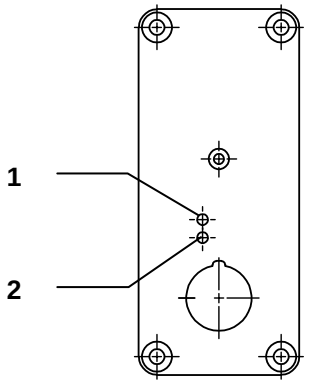

Figure 11-2: Amplifier board

1 Potentiometer for the force offset

2 Potentiometer for the amplification

If you turn the screw on the potentiometer, but the value in the “Offset force” does not change:

☞ Switch the control unit off.

☞ Switch the control unit on again.

☞ Try again to set the force offset.

11.2 Calibrating the force sensor

Since the force measuring system is usually used for measuring quality-relevant specifications, it should be inspected and, if necessary, calibrated at reasonable intervals established by the user. As specified by the DIN EN ISO 9000, a calibration of the system must be carried out at regular intervals.

The calibration is also offered by SCHMIDT Technology as part of its customer service.

Prerequisite

A reference measuring system is needed for the calibrating of the force measuring system. A calibration value is calculated using the measured value of the reference measuring system and the measured value of the machine.

SCHMIDT Technology optionally offers the SCHMIDT® LoadCheck reference measuring system for the calibration of your system.

Preparing press system

☞ Select the "Data Output" system function key.

☞ Press the "Data Output" system function key again to display the "Data Output 2".

☞ Place the force sensor of the reference measuring system beneath the ram.

Recording measured values

☞ Subject the force sensor to the nominal pressing force.

☞ Read the reference measured value on the display module (display in kN) and the measured value of the press system.

☞ Make a note of both values.

☞ Start the return stroke.

Entering measured values

☞ Select the "System Options" system function key.

☞ In the "System Options" submenu, select the "Calibrate analog Inputs" command.

☞ Select the "Analog Input 1".

☞ Enter the noted value (in kN) into the "Value Machine" parameter.

☞ Enter the noted value (in kN) into the "Value Reference" parameter.

Calculating calibration value

☞ Select "Calculate & Save" using the arrow key.

☞ Confirm the entry by pressing the "Enter" key. The control calculates the new calibration value from the two entered values and displays the result.

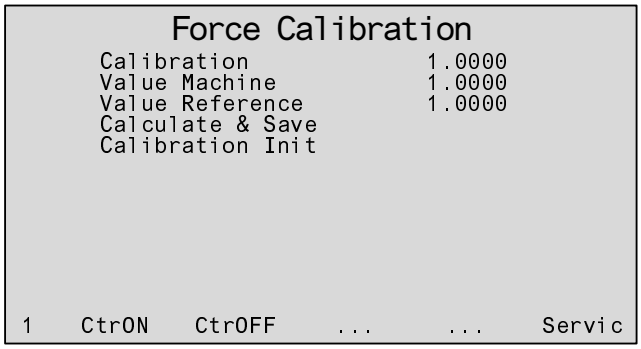

Figure 11-3: "Force Calibration" submenu

Checking calibration

☞ Subject the force sensor again to a load.

☞ Compare the measured value of the reference measuring system with the measured value of the machine.

☞ Repeat the calibration process if the values do not coincide.

The calibration affects the value of the force offset.

☞ After the calibration, check whether the value has changed.

☞ After a large change has taken place, set the force offset again. For more information on setting the force offset, please see chapter "11.1 Setting the force offset".

Resetting calibration value

If there are large calibration errors, you can reset the calibration value to "1".

☞ Select the "Calibration Init" command.

When using the optional analog output 2 to measure quality-relevant dimensions, regular inspections or calibrations should be made.

☞ Proceed as described at "Analog input 1".

11.3 Adjusting the stroke offset

After work has been performed on the stroke sensors, the reference marker on the scale are rarely at the original location. This offset must be compensated. You can set this value using the stroke offset.

When the ram is in the "TDC" position, the "Output 2" view of the data output must not exhibit a negative stroke. The value 603 corresponds to the zero point in the control. If, therefore, a value smaller than 603 is displayed, it is considered a negative stroke.

A stroke offset of 1 to 1.5 mm is set ex works. The system requires this value to be in the range between 0 and 3 mm. If the value is outside this range, the stroke offset must be set again and tolerances that have already been set may have to be adjusted.

- ☞ Select the "Data Input" system function key.
- ☞ Select parameter 59, "Offset Stroke". Using the "Left" and "Right" cursor keys, you can jump from on block of 10 to the next.
- ☞ Enter the value "0" as new stoke offset.
- ☞ Select View 2 of the data output.

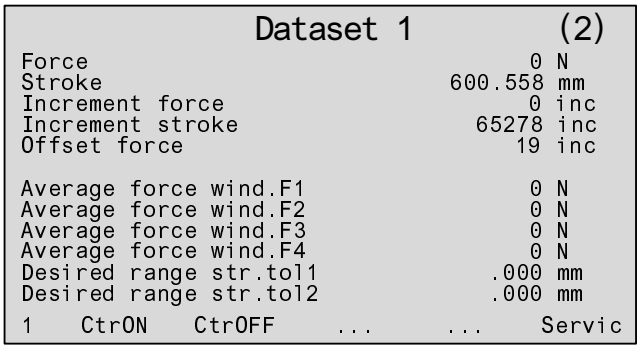
Dataset 1 (2)
Force 0 N
Stroke 600.558 mm
Increment force 0 inc
Increment stroke 65278 inc
Offset force 19 inc
Average force wind.F1 0 N
Average force wind.F2 0 N
Average force wind.F3 0 N
Average force wind.F4 0 N
Desired range str.tol1 .000 mm
Desired range str.tol2 .000 mm
1 CtrON CtrOFF ... ... Servic

Figure 11-4: View of "Output 2"

- ☞ Write down the stroke displayed (e.g. 600.558 mm).
- ☞ Subtract the value "1" from this value (e.g. . 600.558 – 1 = 599. 558).
- ☞ Enter the calculated value in parameter 59 "Offset stroke".

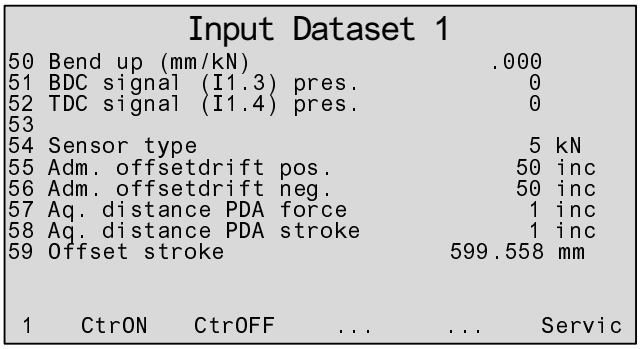
Input Dataset 1
50 Bend up (mm/kN) .000
51 BDC signal (I1.3) pres. 0
52 TDC signal (I1.4) pres. 0
53
54 Sensor type 5 kN
55 Adm. offsetdrift pos. 50 inc
56 Adm. offsetdrift neg. 50 inc
57 Aq. distance PDA force 1 inc
58 Aq. distance PDA stroke 1 inc
59 Offset stroke 599.558 mm
1 CtrON CtrOFF ... ... Servic

Figure 11-5: Enter the "Offset stroke"

The position measuring system does not have to be calibrated due to the fact that it is a digital system.

12 Customer Service

Please contact to the SCHMIDT Technology Customer Service department when you encounter difficulties with the press system or the software.

Describing problem in detail

- ☞ Note, if possible, the error message.
- ☞ Inform the SCHMIDT® Customer Service:

  When and how often has the problem occurred, and what changes has been made recently?

System identification

When making contact with the SCHMIDT® Customer Service by phone, we need information concerning the control unit software.

This information can be seen in the "System Options" display mode.

- ☞ Select the "System Options" system function key.
- ☞ Select the "System Options" menu.
- ☞ In the "Service" submenu, select the "Ident" command.